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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,684	07/31/2003	Magdy Salama	2929-0223P	7661

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EXAMINER	
LAXTON, GARY L	

ART UNIT	PAPER NUMBER
2838	

DATE MAILED: 09/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/630,684	SALAMA ET AL.	
	Examiner	Art Unit	
	Gary L. Laxton	2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 07/28/05 have been fully considered but they are not persuasive.

Applicant first argues, that Shelly does not disclose that the inverter (12) operates at a high frequency and therefore, outputs a high frequency wave. There is no doubt that the inverter of Shelly outputs a frequency wave and since the applicant has not claimed what the applicant believes to be high frequency; the examiner contends, that the frequency at which the inverter of Shelly operates at is considered "high"; therefore, Shelly does disclose outputting a high frequency wave.

In response to applicant's second argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Gallios et al specifically teach that one use of high voltage converters using high voltage multipliers would be the case for a CRT power supply (col. 7 lines 2-10). Therefore, one reason to add a multiplier to Shelly is, as stated in the last office action, to power a high

voltage load that Shelly would not be able power without the multiplier, such as a CRT load which requires a high output power supply as expressly taught by Gallios et al.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 7-12, 18-22, and 24-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shelly (US 4,251,857) in view of Gallios et al (US 4,893,227).

Claims 1, 7-12, 18-22 and 24-30; Shelly discloses a high-voltage power supply and method, comprising: a power scaling section (10) receiving an input voltage signal (Vin) and converting the input voltage signal to a controllable DC voltage (e.g. C1); a push-pull converter (Q2, Q3) for converting the controllable DC voltage to a high-frequency wave and wherein the generated high-voltage DC output is varied as the controllable DC voltage varies (abstract). The high-frequency wave is a square wave. The high-frequency wave has an amplitude of approximately 0-to-1 kV. The control module is an analog controller. Shelly further discloses: controlling the scaling and converting steps in accordance with a command signal. Shelly further discloses wherein the power scaling section includes a switching element, a duty cycle of which controls the amplitude of the controllable DC voltage, and the control module outputs a gate switching signal to the switching element of the power scaling section as a function of a desired output voltage of the high-voltage power supply. Shelly further discloses wherein the control

module receives a feedback signal based on the output of the power scaling section to adjust the gate switching signal. Shelly further discloses wherein the push-pull converter includes a plurality of switching elements and a transformer for generating the high-frequency wave, and the control module outputs gate switching signals to the switching elements of the push-pull converter to control the frequency of the high-frequency wave

However, Shelly does not disclose a voltage multiplier receiving the high-frequency wave generated by the push-pull converter and performing successive voltage doubling operations to generate a high-voltage DC output. Shelly also does not disclose the frequency of the high-frequency wave is approximately 100 kHz or that the power supply generates an output voltage of in the range of approximately 0-to-30 kV, DC

Gallios et al teaches a two stage full-wave Cockroff-Walton high voltage multiplier 20 for receiving high frequency wave generated by a push pull converter for performing successive voltage doubling operations to generate a high voltage dc output in order to provide high output voltage to a load requiring very high output voltage. Gallios et al also teach wherein the frequency of the high-frequency wave is approximately 100 kHz (col. 5 line 31) and that high power density is afforded by the high switching frequency used, enabling the use of much smaller, lighter, and lower cost magnetics and capacitors (col. 1 lines 10-25). Gallios et al further disclose the controllable DC voltage is in the range of approximately 0-to 30 kV.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Shelly to include a voltage multiplier for receiving high frequency wave generated by a push pull converter for performing successive voltage doubling operations to generate a high voltage dc output in order to provide high output voltage to a load

requiring very high output voltage as taught by Gallios et al and to produce the high frequency wave at approximately 100kHz in order to afford high power density by the high switching frequency used, enabling the use of much smaller, lighter, and lower cost magnetics and capacitors. And it would have been obvious to modify Shelly with the teachings of Gallios et al to produce a high voltage used to power a high voltage load; a voltage high enough, for example, to power a CRT load circuit as taught by Gallios et al.

Claim 31; Shelly discloses a high-voltage power supply, comprising: a power scaling section (10) receiving an input voltage signal (Vin) and converting the input voltage signal to a controllable DC voltage (e.g. C1); a push-pull converter (Q2, Q3) for converting the controllable DC voltage to a high-frequency wave, the high-frequency wave having a frequency;

However, Shelly does not disclose a voltage multiplier receiving the high-frequency wave generated by the push-pull converter and performing successive voltage doubling operations to generate a high-voltage DC output; the generated high-voltage DC output being varied as the controllable DC voltage varies so as to output various desired output voltage levels in a range that includes voltages up to approximately 30kV. Shelly also does not disclose that the frequency is greater than approximately 20 kHz.

Gallios et al teaches a two stage full-wave Cockroff-Walton high voltage multiplier 20 for receiving high frequency wave generated by a push pull converter for performing successive voltage doubling operations to generate a high voltage dc output in order to provide high output voltage to a load requiring very high output voltage. Gallios et al also teach wherein the frequency of the high-frequency wave is approximately 100 kHz (col. 5 line 31) and that high power density is afforded by the high switching frequency used, enabling the use of much

smaller, lighter, and lower cost magnetics and capacitors (col. 1 lines 10-25). Gallios et al further disclose the controllable DC voltage is in the range of approximately 0-to 30 kV.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Shelly to include a voltage multiplier for receiving high frequency wave generated by a push pull converter for performing successive voltage doubling operations to generate a high voltage dc output in order to provide high output voltage to a load requiring very high output voltage as taught by Gallios et al and to produce the high frequency wave at approximately 100kHz in order to afford high power density by the high switching frequency used, enabling the use of much smaller, lighter, and lower cost magnetics and capacitors. And it would have been obvious to modify Shelly with the teachings of Gallios et al to produce a high voltage used to power a high voltage load; a voltage high enough, 30kV for example, to power a CRT load circuit as taught by Gallios et al.

4. Claims 2-6 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shelly (US 4,251,857) and Gallios et al (US 4,893,227) in view of Gak et al (US 6,141,225).

Claim 2; Shelly and Gallios et al disclose the claimed subject matter in regards to claim 1 supra, except for a control module for controlling both the power scaling section and the push pull converter.

Gak et al teach using one control module (19) for controlling the power scaling section and the push-pull converter.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize one controller to control both the power scaling section and the push pull converter as taught by Gak et al in place of two separate controllers in order to reduce manufacturing costs.

Claim 3; Gak et al further disclose wherein the power scaling section includes a switching element (12), a duty cycle of which controls the amplitude of the controllable DC voltage, and the control module outputs a gate switching signal (20) to the switching element (12) of the power scaling section (11) as a function of a desired output voltage of the high-voltage power supply.

Claim 4; Gak et al further disclose wherein the control module receives a feedback signal (16) based on the output of the power scaling section to adjust the gate switching signal (20).

Claim 5; Gak et al further disclose wherein the push-pull converter includes a plurality of switching elements (14A, 14B) and a transformer (15) for generating the high-frequency wave, and the control module outputs gate switching signals (CLK-PPA, CLK-PPB) to the switching elements (14A, 14B) of the push-pull converter (13) to control the frequency of the high-frequency wave.

Claims 6 and 23; Gak et al further disclose the switching elements are MOSFET switching elements.

5. Claims 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shelly (US 4,251,857) in view of Gallios et al (US 4,893,227) and further in view of in view of Adasko et al (US 5,414,224).

Claims 13-17; Shelly and Gallios et al disclose the claimed subject matter in regards to claim 1 supra, except for the voltage multiplier includes voltage doubler stages on a circuit board and the high-voltage power supply further comprises an insulation system associated with the circuit board. And, the insulation system is a multi-layer system of n layers of insulation and m conducting strips positioned between successive insulating layers; wherein the insulation system is a field-controlled multi-layer insulation system. And lastly, the plurality of voltage doubler stages are divided among multiple circuit boards, separate from the power scaling section and the push-pull converter.

First, it has been held that forming in one piece an article which has formerly been formed in two pieces and put together (such as integrating circuit components on a circuit board) involves only routine skill in the art. *Howard v. Detroit Stove works*, 150 U.S. 164 (1893). Therefore, integrating parts on a circuit board is routinely obvious to one having ordinary skill in the art.

Secondly, duplication of parts is well known in the art; since it has bee held that mere duplication of the essential working parts of a device (such as connecting plural circuit boards together) involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8. Therefore, duplicating multiple voltage doubler circuit boards is routinely obvious to one having ordinary skill in the art.

Adasko et al teach forming a multilayered printed circuit board having layers with insulation between; and conducting strips between as well.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the circuit combination of Shelly and Gallios et al to include the voltage multiplier on a circuit board and further comprising an insulation system associated with the circuit board comprising insulating layers and conducting strips to form a field-controlled multi-layer insulation system in order to form an integrated small form multilayered printed circuit board for use in an electronic power supply circuit. And further, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Shelly and Gallios et al to include plural circuit boards separate from separate from the power scaling section and the push-pull converter in order to provide a plurality of separate voltage circuits to provide high voltage power to a plurality of different loads, since duplicating parts is routine to those skilled in the art.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary L. Laxton whose telephone number is (571) 272-2079. The examiner can normally be reached on Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on (571) 272-2084. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gary L. Laxton
Primary Examiner
Art Unit 2838

8/26/05